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THE BOTANICAL GAZETTE

EDITORS:

JOHN M. COULTER, University of Indiana, Bloomington, Ind.
CHARLES R. BARNES, University of Wisconsin, Madison, Wis.
J. C. ARTHUR, Purdue University, Lafayette, Ind.

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In the October number will appear:

A preliminary comparison of the hepatic flora of boreal and sub-boreal regions, by DR. LUCIEN M. UNDERWOOD, *DePauw University.*

Bacteriological investigations of marine waters and the sea-floor, by DR. H. L. RUSSELL, *University of Chicago.*

A peculiar case of plant dissemination, by EDWARD L. BERTHOUD, *Golden, Colorado.*

Notes on certain species of Erythronium, by PROF. E. B. KNERR, *Midland College, Atchison, Kansas.*

BOTANICAL GAZETTE

SEPTEMBER, 1892.

Flowers and insects. IX.

CHARLES ROBERTSON.

HYDRANGEA ARBORESCENS L.[1]—The stems rise from one to several feet high and bear flat-topped compound cymes measuring seven to ten centimeters across. Each cyme is commonly surrounded by a few large sterile flowers which render it much more conspicuous. These sterile flowers are remarkably persistent, retaining their form throughout the winter, though they lose their color.

The entire fertile flower with its pedicel is white. The petals are small and soon fall. The stamens, which are commonly ten, with their large anthers, are the most conspicuous part of the flower. When dehiscent they far overtop the stigmas. Nectar is secreted on the base of the styles, though pollen is the chief attraction.

The flowers are homogamous, but are visited by so many bees and flies that frequent cross-pollination is inevitable. Insects may also effect self-pollination, or spontaneous self-pollination may occur by the pollen falling upon the stigmas.

The plants are common on creek banks and were observed in bloom from June 24th to July 23rd. The following list of visitors was observed June 27th and 30th:

Hymenoptera—*Apidæ:* (1) Bombus separatus Cr. ♂, c. p., ab.; (2) B. americanorum F. ♀, c. p.; (3) Ceratina dupla Say ♀, s. and c. p.; (4) Heriades carinatum Cr. ♀, c. p.; *Andrenidæ:* (5) Augochlora labrosa Say ♀, s. and c. p.; (6) Halictus pectoralis Sm. ♂♀, s. and c. p.; (7) H. similis Sm. ♀, s. and c. p.; (8) H. truncatus Rob. (MS.) ♀, s. and c. p.; (9) H. fasciatus Nyl. ♀, c. p.; (10) H. confusus Sm. ♀, s. and c. p., ab.; (11) H. stultus Cr. ♀, s. and c. p., ab.; (12) Prosopis affinis Sm. ♂♀, s. and f. p., ab.; *Crabronidæ:* (13) Crabro interruptus Lep., s.

[1] See Meehan: Contributions to the life histories of plants, No. II, Proc. Acad. Nat. Sci., Phil., 1888.

Diptera—*Empidæ:* (14) Empis clausa Rob. (MS.) s., ab.; *Conopidæ:* (15) Oncomyia loraria Lw., s., freq.; (16) Stylogaster biannulata Say, s.; *Syrphidæ:* (17) Paragus tibialis Fll., s. and f. p.; (18) Syrphus americanus Wd., s. and f. p.; (19) Allograpta obliqua Say, s. and f. p.; (20) Mesograpta geminata Say, s. and f. p.; (21) Sphaerophoria cylindrica Say, s. and f. p.; (22) Eristalis tenax L., s.; (23) Syritta pipiens L., s. and f. p.; *Tachinidæ:* (24) Jurinia apicifera Wlk., s.; *Muscidæ:* (25) Graphomyia sp., s.; (26) Musca domestica L., s.; (27) Lucilia cornicina F., s.

Coleoptera—*Cerambycidæ:* (28) Euderces picipes F., s. and f. p.; (29) Typocerus velutinus Oliv., s. and f. p.; *Mordellidæ:* (30) Mordella marginata Melsh., s., ab.; (31) Mordellistena sp., s., ab.; (32) M. ornata Melsh.

Lepidoptera—*Hesperidæ:* (33) Eudamus tityrus F., s.; *Pyromorphidæ:* (34) Harrisina americana Harr., s. (determined by Prof. G. H. French).

PHILADELPHUS GRANDIFLORUS Willd.[2]—This plant occurs in my neighborhood only in cultivation. I have found it visited very abundantly by *Heriades philadelphi* Rob. ♂♀.

RIBES GRACILE Michx.—The Missouri gooseberry is common in woods, blooming from April 15th to May 3d. The bushes are sometimes collected in large clumps, the flowers being abundant enough to fully repay the attention of insects.

The greenish flowers grow in axillary clusters of two or three. The pendulous position and the characters of the flower indicate an adaptation to bees. The calyx tube is two or three mm. long. The oblong lobes, which measure six or seven mm. in length, are strongly reflexed. With the petals they form footholds for the bees to cling to, and with their purplish bases, are the most conspicuous parts of the flower. The five stamens are exserted 12 mm. or more beyond the calyx-tube, and are closely approximated. Five pinkish petals about 2 mm. long are pressed against the filaments, closing as far as they go the intervals between them.

The flowers are proterandrous. When receptive, the stigma surpasses the anthers a little. The anthers sometimes retain pollen after the stigma becomes receptive, but self-pollination is hardly possible, unless it is brought about by insect aid. Everything points to cross-pollination between separate flowers.

[2]On P. coronarius see Müller: Fertilization of Flowers, 248.

The nectar is secreted by an epigynous disk and is held in place by the abundant hairs on the base of the style and on the wall of the calyx-tube. To reach it bees must insert their proboscides between the filaments beyond the tips of the petals. For this purpose a proboscis at least 4 mm. long seems to be needed.

The flowers are especially adapted to bumblebee females, the only sex of Bombus flying while the flowers are in bloom. These bees are the only ones which, while sucking, invariably touch the anthers and stigmas. They cling to the petals and sepals, and the anthers and stigmas strike them about the base of the ventral surface of the abdomen. Of these the following were noted visiting the flowers for nectar:

(1) Bombus separatus Cr. ♀; (2) B. vagans Sm. ♀; (3) B. virginicus Oliv. ♀, ab.; (4) B. americanorum F. ♀, very ab.

Besides bumblebees there occur as frequent visitors a number of species of bees which insert their proboscides between the filaments and are able to reach the nectar, but are so small that they never, or rarely, touch the anthers and stigmas, and so are to be regarded as mere intruders. Such are:

Apidæ: (1) Apis mellifica L. ☿, s. and c. p., ab.; (2) Osmia albiventris Cr. ♂, s.; (3) O. lignaria Say ♂, s.; (4) Nomada luteola Lep. ♂♀, s.; *Andrenidæ:* (5) Agapostemon radiatus Say ♀, s.; (6) Augochlora pura Say ♀, s.; (7) A. lucidula Sm. ♀, s.; (8) Andrena sayi Rob. ♂♀, s., ab.; (9) A. pruni Rob. ♂♀, s.; (10) A. rugosa Rob. ♂, s.; (11) Halictus gracilis Rob. ♀, f. p., ab.; (12) H. coriaceus Sm. ♀, s.; (13) H. lerouxii Lep. ♀, s. and f. p.; (14) H. cressonii Rob. ♀; (15) H. zephyrus Sm. ♀; (16) H. imitatus Sm. ♀; (17) H. stultus Cr. ♀; (18) Colletes inaequalis Say ♂♀, s.

Diptera—*Empidæ:* (19) Empis sp., s.

The visitors were observed on nine days between April 18th and 29th.

LUDWIGIA ALTERNIFOLIA L.—The yellow flowers are rather conspicuous. Honey collects in round drops in four pits on the sides of the ovary between the bases of the filaments. The pits are slightly protected above by a fringe of hairs. Some of the anthers dehisce when fairly in contact with the stigma, but much of the stigma remains clear, and so can receive pollen brought by insects. *Bombus americanorum* F. ☿, was seen visiting the flowers for nectar, and *Halictus stultus* Cr. ♀, visiting them for pollen. The flowers were seen in bloom from July 19th to Aug. 10th.

LUDWIGIA POLYCARPA S. & P.—The flowers are wholly devoid of entomophilous characters. The petals are wanting, and there is no nectar. The four stamens bend inwards, bringing the anthers in contact with the stigma. Spontaneous self-pollination is therefore a regular occurrence.

ŒNOTHERA BIENNIS L.[3]—The following list was observed on Aug. 26th and 29th:

Apidæ: (1) Bombus americanorum F. ♂ ☿, s. and c. p., freq.; (2) Melissodes bimaculata Lep. ♀, c. p.; (3) M. obliqua Say ♀, c. p.

Trochilidæ: (4) Trochilus colubris L., s., two.

I have found the flowers in bloom from July 22nd to Oct. 15th.

Müller found it visited by one Macroglossa, three Bombus, one Apis, one Colletes, one Panurgus, three Eristalis.

ŒNOTHERA FRUTICOSA L.—This is a common plant, growing on prairies. The stem rises a few dm. and generally bears one, sometimes two or three, yellow flowers which expand 4 or 5 cm. Eight large versatile anthers supply pollen, which is an attractive character of the flower. The stigma surpasses the anthers so that self-pollination is impossible without insect aid. As a rule, the stigma is inclined to the lower side in such a position that it readily strikes the ventral surface of a bumble-bee settling upon the flower. If insects come with pollen, they may effect cross-pollination, otherwise they may effect self-pollination. When two or more flowers are expanded at the same time cross-pollination between flowers of the same plant may occur. In the usual case in which the stem exposes only one open flower at a time cross-pollination between distinct plants is the rule.

The tube measures 14–20 mm., so that it can only be drained by the largest bees, but shorter-tongued bees are sometimes able to reach a little of the nectar which rises in the tube.

Besides the long-tongued insects which visit the flower for nectar, there are many species, especially Andrenidae and Syrphidae, which come only for pollen. Accordingly the flower must be regarded as adapted to both sets of insects.

The flowers bloom from May 24th to June 29th. On 7 days, between May 28th and June 19th, the following list was observed:

[3] See Müller: Fertilization of Flowers, 246.

Hymenoptera—*Apidæ:* (1) Bombus americanorum F. ♀, s. and c. p., ab.; (2) Synhalonia speciosa Cr. ♀, s. and c. p.; (3) Ceratina dupla Say ♀, c. p.; (4) Megachile brevis Say ♂♀, s.; (5) M. montivaga Cr. ♂♀, s. and c. p., ab.; (6) Alcidamea producta Cr. ♀, c. p.; *Andrenidæ:* (7) Agapostemon nigricornis F. ♀, c. p., ab.; (8) Augochlora pura Say ♀, c. p., freq.; (9) Halictus pectoralis Sm. ♀, c. p.; (10) H. parallelus Say ♀, c. p.; (11) H. lerouxii Lep. ♀, c. p.; (12) H. ligatus Say ♀, c. p.; (13) H. fasciatus Nyl. ♀, c. p.; (14) H. albipennis Rob. ♀, c. p.; (15) H. confusus Sm. ♀, c. p.

Diptera—*Syrphidæ:* (16) Syrphus americanus Wd., f. p.; (17) Sphaerophoria cylindrica Say, f. p.; (18) Eristalis dimidiatus Wd., f. p.; (19) E. latifrons Lw., f. p.; (20) Tropidia mamillata Lw., f. p.; *Tachinidæ:* (21) Cistogaster pallasii Twns., f. p.

Lepidoptera—*Rhopalocera:* (22) Pieris protodice B.-L.; (23) Pamphila peckius Kby.; (24) P. cernes B.-L.—all s.

Coleoptera—*Chrysomelidæ:* (25) Diabrotica 12-punctata Oliv., f. p.; *Curculionidæ:* (26) Centrinus scutellum album Say, f. p., ab.

GAURA BIENNIS L.[4]—This common species was observed in bloom from August 4th to October 24th. The stems grow one or two metres high, bear numerous flowers, and are often collected in large patches.

The flowers are white. The four petals are all turned to the upper side of the flower, and the stamens, which are directed horizontally, afford a landing place to the visiting insects. The stigma is in advance of the anthers and touches the bee before them. The calyx tube is about 10 mm. long. The flowers are adapted to long-tongued bees, but on account of the exposure of the anthers are also visited for pollen by other insects. The list was observed on 5 days, between Aug. 23d and Sept. 10th.

Hymenoptera—*Apidæ:* (1) Apis mellifica L. ☿, c. p.; (2) Bombus americanorum F. ☿, s. and c. p., ab.; (3) B. virginicus Oliv. ☿, c. p.; (4) Melissodes bimaculata Lep. ♀, s. and c. p.; *Andrenidæ:* (5) Halictus confusus Sm. ♀, c. p.

Diptera—*Syrphidæ:* (6) Syrphus americanus Wd., f. p.

CIRCÆA LUTETIANA L.—The flower is described and figured by Müller in the Fertilization of Flowers, 265. Müller saw

[4] See Sprengel; 223, Pl. XIII, 12, 14, 15. See G. Lindheimeri, Goodale & Sprague: Wild flowers, Pl. XXIII.

the flowers visited by: *Syrphidæ:* (1) Baccha elongata F.; (2) Ascia podagrica F.; (3) Melanostoma mellina L.; *Muscidæ:* (4) Musca domestica L.; (5) Anthomyia sp.

July 2nd, 4th and 10th I saw the flowers visited by:

Hymenoptera—*Andrenidæ* (1) Augochlora pura Say ♀, s. and c. p., freq.; (2) Halictus 4-maculatus Rob. ♂ ♀, s. and c. p., ab.; (3) H. confusus Sm. ♀, s. and c. p.; (4) H. pectinatus Rob. ♀, c. p.; *Chalcididæ:* (5) Spilochalcis debilis Say, s.

Diptera—*Bombylidæ:* (6) sp.; (7) Hemipenthes sinuosa Wd., f. p.; *Syrphidæ:* (8) Allograpta obliqua Say; (9) Mesograpta marginata Say; (10) M. geminata Say—all sucking.

MOLLUGO VERTICILLATA L.[5]—"An immigrant from farther south."—The plants are much branched, the branches lying flat on the ground and bearing small, white flowers, which are numerous but not enough to form conspicuous clusters.

The flowers are erect, expand horizontally and measure about 4 mm. across. The three anthers rise to the level of the three stigmas and alternate with them.

In case of insect visits, cross-pollination between flowers of the same or of distinct plants may readily occur. In case insects fail, spontaneous self-pollination may take place by the anthers coming in contact with the stigmas.

Although the flowers are very inconspicuous, they are attractive to numerous small insects, mainly *Halictus*, on account of their easily accessible nectar.

I have found the plant in bloom from July 1st to Oct. 12th. On three days, July 16th, and Aug. 11th and 21st, the following list of visitors was observed:

Hymenoptera—*Andrenidæ:* (1) Halictus fasciatus Nyl. ♂, s.; (2) H. pilosus Sm. ♂, s.; (3) H. confusus Sm. ♂ ♀, s. and c. p. freq.; (4) H. tegularis Rob. ♂ ♀, s.; (5) H. stultus Cr. ♀, s. and c. p. freq.; *Philanthidæ:* (6) Cerceris finitima Cr., s., freq.

Diptera—*Conopidæ:* (7) Zodion nanellum Lw.; *Syrphidæ:* (8) Paragus tibialis Fll.; (9) Pipiza pulchella Will.; (10) Mesograpta marginata Say; *Sarcophagidæ:* (11) Sarcophaga sp.; *Muscidæ:* (12) Lucilia cornicina F.—all sucking.

Coleopetra—*Malachidæ:* (13) Collops 4-maculatus F., s.

SAMBUCUS CANADENSIS L.—The stems grow three or four meters high, and are commonly collected in clumps, which at blooming time are fairly white with the large flat-topped cymes. The flowers expand 4 or 5 mm. They are homo-

[5] On this plant see Meehan; Torrey Bulletin, XIV, 218.

gamous. The stamens are so strongly divergent that spontaneous self-pollination is impossible. Nectar is wanting, the object of insect visits being the pollen. The plant is common and was observed in bloom from June 15th to July 25th. June 17th, 23d and 24th, the following visitors were noted:

Hymenoptera—*Apidæ:* (1) Apis mellifica L. ☿, freq., (2) Ceratina dupla Say ♀; *Andrenidæ:* (3) Halictus zephyrus Sm. ♀, ab.; (4) H. confusus Sm. ♀, ab.; (5) H. stultus Cr. ♀, ab.—all collecting pollen.

Diptera—*Bombylidæ:* (6) sp.; (7) Hemipenthes sinuosa Wd.; *Syrphidæ:* (8) Chrysogaster nitida Wd., ab.; (9) Syrphus ribesii L., freq.; (10) Allograpta obliqua Say, freq.; (11) Mesograpta marginata Say; (12) Eristalis dimidiatus Wd.; *Muscidæ:* (13) Lucilia cornicina F.; *Anthomyidæ:* (14, 15) Chortophila spp.—all feeding on pollen.

Coleoptera—*Dermestidæ:* (16) Attagenus piceus Oliv.; *Malachidæ:* (17) Anthocomus erichsoni Lec.; *Cerambycidæ:* (18) Euderces picipes F.; *Mordellidæ:* (19) Pentaria trifasciata Melsh.—all feeding on pollen.

HOUSTONIA PURPUREA L., VAR. CALYCOSA Gr.—This common plant grows in tufts or clusters which are rendered quite conspicuous by the abundant white flowers, the stems rising about 2 dm.

The corolla is funnel-form, measuring about 8 mm. in length, its border also expanding about 8 mm. The tube is about 7 mm. Below it is narrowed for about 4 mm. Small bees can insert their heads as far as 3 mm., when they need a proboscis 4 mm. to drain the sweets. The narrow part of the tube is obstructed in both forms by abundant hairs, in the long-styled form by the anthers and in the short-styled form by the stigma. The anthers of the short-styled form are in the angles of the mouth of the tube, the stigma of the long-styled form being more strongly exserted.

The anthers of the long-styled form apply their pollen to the proboscides of the visitors. The anthers of the short-styled form dust their pollen indefinitely upon all parts of the insects. Accordingly the long-styled form has a larger stigma.

The flowers are adapted to small bees, like *Ceratina*, *Calliopsis* and *Halictus*, but are also visited by flies, beetles and butterflies. Butterflies, however, are only adapted to pollinate the short-styled form, since they can suck this form with-

out touching the anthers. A monopoly of the flowers by them would probably result in a functional diœcism, characterized by long-styled staminate and short-styled pistillate flowers.

The plant blooms from May 19th to June 30th. The list was observed on 6 days, between May 25th and June 12th.

Hymenoptera—*Apidæ:* (1) Apis mellifica L. ☿, s.; (2) Synhalonia honesta Cr. ♂, s.; (3) Ceratina dupla Say ♂♀, s. and c. p., ab.; (4) Heriades carinatum Cr. ♂ s.; (5) Calliopsis andreniformis Sm. ♂♀, s. and c. p., ab.; *Andrenidæ:* (6) Augochlora pura Say ♀, s. and c. p.; (7) Halictus ligatus Say, ♀, s.; (8) H. pilosus Sm. ♀, s. and c. p.; (9) H. confusus Sm. ♀, s. and c. p.; (10) H. albipennis Rob. ♀, s. and c. p.

Diptera—*Syrphidæ:* (11) Paragus bicolor F., s.; (12) P. tibialis Fll., s.; (13) Mesograpta marginata Say, s.; (14) Sphaerophoria cylindrica Say, s. and f. p., ab.; (15) Syritta pipiens L., s.

Lepidoptera—*Rhopalocera:* (16) Pieris protodice B.-L.; (17) Chryophanus thoe B.-L.; (18) Ancyloxypha numitor F., ab.; (19) Pholisora catullus F. —all sucking.

Coleoptera—*Scarabæidæ:* (20) Trichius piger F., s., ab.; *Curculionidæ:* (21) Centrinus scutellum-album Say, s.; (22) Stethobaris sp., s.

Carlinville, Ill.

Botanical papers read before Section F, A. A. A. S., Rochester meeting.

N. L. BRITTON: "*Notes on Ranunculus repens and its eastern North American allies.*"—Attention was called to the group relationship that evidently exists between the European R. repens and such American species as *R. hispidus* Mx., *R. fascicularis* Muhl., *R. septentrionalis* Poir., *R. palustris* Ell. (a somewhat doubtful southern species), and the British Columbian *R. Macounii* Britton. Illustrated by specimens.

N. L. BRITTON: "*Notes on a monograph of the North American species of Lespedeza.*"—The author believes that it would facilitate the study of these species to recognize a greater number of species than heretofore, instead of considering some of them forms. Illustrated by numerous specimens.

W. W. ROWLEE: "*The root-system of Mikania scandens.*"—Mikania develops a great number of roots under water which never reach the soil. The greatest development of these is

during and after anthesis, in autumn, when the root-branching is immense. These roots come to the surface and either float or rise above it. If the water rises above them they grow longer. When transplanted to dry conditions the same root-system is developed. The rootlets, however, are not so long, but stop just above the surface of the ground, forming multitudes of little "knees" about an inch or less in height. A peculiar anatomical structure is found in the presence (in section) of four peculiarly modified cells, two of which belong to the endodermis and two to the row of cells just outside. These cells always lie in contact with the phloem cells and are so arranged as to enclose a rectangular intercellular space of considerable size and definite shape. They have large nuclei which are always upon the side of the cell next to the intercellular space. These spaces extend to very near the growing point of the root, thus forming long tubes. This, taken in connection with the peculiar development of the roots and their place of growth, is strong evidence in favor of their performing the function of aeration.

L. M. UNDERWOOD: "*Preliminary comparison of the hepatic flora of boreal and sub-boreal regions.*"—To be published in full in the GAZETTE.

E. F. SMITH: "*On the value of wood-ashes in the treatment of peach-yellows.*"—This well-known treatment had been fully tested, and was found inefficient in all doses. The conclusion was that peach-yellows cannot be cured or prevented by wood-ashes.

E. F. SMITH: "*On the value of superphosphates and muriate of potash in the treatment of peach-yellows.*"—This mixture is that recommended by Profs. Goessmann and Penhallow. It was tested for three years, 1889-1891, and no benefit was discovered. In fact, the treatment seemed rather to favor the disease than otherwise. It was remarked that well-fed plants may become diseased quite as readily as weak plants.

G. MACLOSKIE: "*Notes on maize.*"

W. J. BEAL: "*Spikes of wheat bearing abnormal spikelets.*"—Spikes of Missouri wheat, Champion Amber, Early Red Clawson, and several others, bear spikelets eitherr udimentary or perfect near those normally appearing. These are much like reduced forms of miracle or Egyptian wheat, in which the spikes are branched. Illustrated by specimens.

W. J. BEAL: "*A study of the relative lengths of the sheaths and internodes of grasses for the purpose of determining to*

what extent this is a reliable specific character."—Some agrostologists use this character and some do not. From 10 to 30 plants in each of 47 species were examined, and the internodes and sheaths measured and tabulated. The character proved good in 35 species. In very variable species it is of less importance, and in no case would it be safe to rely upon one or two stems alone. The sheaths and internodes of very tall specimens or very short ones are usually much less reliable for specific characters than those of medium height. The second and third sheaths and internodes from the top are more reliable for this purpose than the others. Illustrated by seven charts.

W. W. ROWLEE: "*Adaptation of seeds to facilitate germination.*"—The most critical time in the life history of the plant is when the embryo is dormant in the seed. Hence it is to be expected that all modifications of the seed have some explanation in the economy of its existence. Careful observation of the germination of seeds of native plants shows that few seedlings are produced. Fruits of Acer dasycarpum are held upright by the wing when falling in grass or rubbish. Planting seeds below the surface of the ground showed that twice as many seeds grew when planted with radicle down as with radicle up. The paper was followed by an interesting discussion concerning the struggle for existence and the vitality of seeds.

H. L. RUSSELL: "*Bacteriological investigations of marine waters and the sea floor.*"—To be published in full in the GAZETTE.

F. V. COVILLE: "*Sketch of the flora of Death Valley, California.*"—The paper was introduced by a general statement of the topography of Death Valley. The absence of trees was spoken of and the characteristics of other vegetation. Lists of species were arranged by groups, with an account of the special adaptation of species to desert conditions. In conclusion the geographical relationship of the flora was discussed.

J. C. ARTHUR: "*How the application of hot water to seed increases the yield.*"—To be published in full in the GAZETTE.

M. MILES: "*Heredity of acquired characters.*"—Weismann's theory of the continuity of a stable, immortal germplasm that is independent of the body-plasm, and transmitted without change from one generation to another, is not warranted by the known facts of physiology, and it cannot,

therefore, be accepted as proof that acquired characters are not hereditable. The transformations of matter and energy in the metabolic processes of nutrition, in plants and animals, as now interpreted by physiologists, must extend to the growth and development of the germ-cells, which are thus brought into intimate relations with the metabolism of every part of the body. The general course and results of the processes of nutrition are essentially the same in plants and animals. The food constituents, in the first place, are built up into protoplasm, with a storing of energy as an indispensable condition of its constitution; and the various tissues and constituents of the organism, including the germ-cells, are then formed as products of its destructive metabolism, with a liberation of a portion of the stored energy in the form of heat. Established habits of the system, or of particular organs, and changes in the environment including conditions of food-supply, have an influence on the general and special processes of metabolism of the system, in which the germ-cells are involved, and the hereditary transmission of the modified habits of the organism are thus provided for. The non-appearance of any peculiarity of the parent in the next generation cannot be accepted as evidence that it has not been transmitted, as it may be obscured and made latent through the dominant influence of other characters, as in the well known facts of atavism. Morphological characters are not more important factors in evolution than the functional activities and bias of the organism on which they depend for their origin and development. The transmission of a morphological character must consist in a transmitted functional activity of the organism that determines the development of the morphological peculiarity under favorable conditions for its exercise. In addition to these physiological considerations, evidence of the heredity of acquired characters was presented in the results of direct experiment, and observations in the breeding and improvement of domestic animals.

L. H. BAILEY. "*On the supposed correlation of quality in fruits--a study in evolution.*"—It is commonly supposed that as quality in cultivated fruits increases various other characters, as size, color, and vigor of plant, decrease. The question is a philosophical one, for its answer must determine whether cultivated plants are subject to the same laws of variation as their wild congeners, whether all characters vary independently, or whether cultivation introduces some

new law of progression in parallelisms. The subject is approached by a study of the scales of points used in the best fruit-lists, by which it becomes apparent that all desirable qualities often appear in the same variety of fruit, and that many of our best market-fruits are also best for the dessert. The best records show that diminished size, low color, comparative seedlessness, tenderness of tree, and lessened vigor, are not correlated with high flavor. It is also shown that there is no loss of sweetness or aroma in domesticated fruits which is due to cultivation and amelioration. It is evident from the whole discussion that quality and other characters of cultivated fruits appear independently of each other, that there is no correlation between these characters. There is general increase in all characters as amelioration progresses, at least in all characters which are particularly sought by horticulturists; and this fact must ever remain the chief inspiration to man in the amelioration of plants.

H. L. RUSSELL: "*Non-parasitic bacteria in vegetable tissue.*"—Experiments were made by infecting healthy plants with various species of bacteria, saprophytic as well as those that are pathogenic for animals, to see (1) the effect of any of these micro-organisms upon the plant, and (2) the reciprocal effect of the host upon the micro-organism. The conclusions reached were that healthy plant-tissues, like animal tissues, are normally free from bacteria; but that, unlike the animal tissue, many micro-organisms are able not only to exist within the tissues of plants, but possibly possess some powers of multiplication.

W. A. KELLERMAN: "*Note on yellow pitch pine.*"—A well marked form of pitch pine was recently found in Fairfield county, Ohio, which may be characterized as *P. rigida* var. *lutea* Kellerman. It differs in the thinner scarcely furrowed reddish-yellow bark, and in the deeper yellow more durable and more distinctly marked heartwood. It occurs with the species, yet appears quite distinct. The form is easily recognized by sight, and is not a mere lumberman's questionable distinction.

W. A. KELLERMAN: "*Germination at intervals of seed treated with fungicides.*"—Experiments in connection with a study of fungicides for smut of oats have shown that seed treated with hot water and solutions of potassic sulphide germinate more quickly than untreated seed. Dr. Arthur has also shown that such treated seeds would continue to

germinate more quickly after a considerable period of time had elapsed. Experiments touching this were instituted, with the following results: (1) That germination of treated seed is more rapid than of untreated seed immediately after treatment; (2) that this action continuously declines with time and the germination is ultimately less rapid and inferior.

M. B. WAITE: "*The fertilization of pear flowers.*"—A brief general account was given of a large series of experiments on the fertilization of pear flowers. Abundant insect visitors were noted and the effect on them of climatic conditions. The general conclusions were: (1) Some cultivated varieties of pear are capable of self-fertilization, but the majority are not; (2) cross-fertilization is effected by insects; (3) cross-fertilization, at least the kind required for the setting of fruits, consists in crossing one horticultural variety with another, and not in crossing one tree of a certain variety with another of the same name.

C. V. RILEY: "*The fertilization of the fig and caprification.*' —A résumé of the subject of caprification in the older countries was given, showing its importance and necessity in the cultivation of the best Smyrna figs, with a statement of the differences between the Smyrna and Adriatic figs. The author considered the question of the importation of *Blastophaga psenes* for the fig-growers of California, and pointed out how it could be successfully done. He touched on the erroneous notions that have been published on the subject, and finally considered the caprifig insects associated with the wild figs of North America, characterizing some fourteen of them from Florida, Mexico and St. Vincent.

F. B. MAXWELL: "*A comparative study of the roots of Ranunculaceæ.*"—The paper contained the results of the examination of the roots of about thirty species native to the northern United States, including a comparative study of the apical meristem and of the changes taking place through secondary growth. Authorities on meristem structure have assigned the roots of this order to a single type; while the author finds two principal types, each including a considerable number of species. It is usually assumed that secondary changes take place to a greater or less extent in mature roots of dicotyledons; but the author finds in many Ranunculaceæ that the primary structure persists in the older roots. On the basis of changes taking place through secondary growth, the author made three classes for the roots studied.

O. F. COOK: "*Do termites cultivate fungi?*"—In the nests of Liberian species of Termes are found honeycombed masses of a punk-like substance, irregularly rounded in general shape. Over all the surfaces and passages of this material there grows the mycelium of a mucor-like fungus, having white sporangia about 5 mm. in diameter. The young termites apparently feed upon these fungi. A similar condition of things obtains with another species of Termes living underground.

JAMES H. STOLLER: "*The conditions which determine the distribution of bacteria in the water of rivers.*"—In the author's absence the paper was read by title.

WILLIAM P. WILSON: "*Adaptations of plants to environment.*"—A comparison of lowland vegetation near the sea with that of desert and mountain areas. A large number of lantern slides were shown, illustrating the ways in which plants of these regions protect themselves against excessive evaporation, particularly by change in position of foliage. In such leaves the author found no change in the position of the chlorophyll bodies. The stomata in the exposed leaves were closed, while those in shaded leaves were open.

S. A. BEACH: "*Notes on self-pollination of the grape.*"—The author showed that the proper time for examining grape-buds to determine whether self-pollination occurs before the flowers open is just at the time when dehiscence of the calyx begins. Clusters of grapes were enclosed in bags before blossoming to prevent the access of foreign pollen. Self-pollination was observed in seventy-seven individuals, distributed among eight species and their hybrids and crosses.

GEO. B. SUDWORTH: "*The comparative influence of odor and color of flowers in attracting insects.*"—Attention was called to a supposed development from a low to a high grade in the colors of flowers, ranging from "the simplest, yellow; 2nd, white; 3d, pink to red; 4th, the most perfect color, blue." The author spoke of his own experiments and those of others, which seem to prove that nectar-gathering insects of higher order (honey bees, etc.) show a preference for the colored flowers of higher grade. He believes, however, that the comparative attractability of color is less powerful in its influence upon insects than that of odor, his experiments showing, first, that the honey bees work persistently upon syrup scented with an artificial sweet odor (anise), but refuse to take the

same sweet when unscented; and second, that color does not attract insects at all when tested equally with an odor, the supply of sweet to be obtained in connection with the color and odor tests being equal in both cases.

CHAS. W. HARGITT: "*Notes on Daucus Carota.*"—In the author's absence the paper was read by title and will be published in full in the GAZETTE.

FREDERICK V. COVILLE: "*Geographical relationship of the flora of the high Sierra Nevada, California.*"—A list of the representative species of the high Sierra Nevada was given, and also a comparison of these plants with those found in the Rocky Mountains and the Cascades. This comparison indicated (1) a large endemic flora of the Sierra Navada, (2) a group of species common to all these ranges; (3) a group of species common only to the Sierras and Cascades; (4) a group common only to the Sierras and Rockies.

W. M. BEAUCHAMP: "*Variation in native ferns.*"

DAVID G. FAIRCHILD: "*Live-for-ever eradicated by a fungous disease.*"—Attention was drawn to a new species of fungus which since 1887 has been in use among the farmers of Cortland Co., N. Y., in the eradication of a most troublesome weed, (Sedum Telephium). A short history of the successful use of this disease was given, with a brief description of the parasitic fungus which causes the destruction of the plants. Attention was called to a new mode of spore-formation connected with the production of the macrospore of this fungus.

GEORGE VASEY: "*Otto Kuntze's changes in the nomenclature of North American grasses.*"—In the author's absence this paper was read by title.

B. E. FERNOW and GEO. B. SUDWORTH: "*Revised nomenclature of the arborescent flora of the United States.*—"The paper points out the practical bearing and importance of the question of nomenclature, and suggests certain principles intended to secure fixity.

C. V. RILEY: "*On Carphoxera ptelearia, the new herbarium pest.*"—In the author's absence the paper was read by title.

FREDERICK V. COVILLE: "*Characteristics and adaptations of desert vegetation.*"—The author spoke of the source and distribution of moisture, its conservation, the temperature, and the seasons. A list of species of the Mohave desert, arranged by groups, was given, with a discussion of general and particular adaptations.

FILIBERT ROTH: "*Shrinkage of wood as observed under the microscope:*"—In the author's absence the paper was read by title.

L. H. PAMMEL: "*Peziza sclerotiorum;*" and "*Temperature and some of its relations to plant life.*"—In the author's absence these two papers were read by title.

BYRON D. HALSTED: "*Pleospora of Tropæolum majus.*" A fungus of the Alternaria type was found upon the foliage of a garden nasturtium, associated with the perithecia of a Pleospora. Cultures upon slant agar tubes were made of the Alternaria spores and a pure growth of the black mould obtained, followed by the ascigerous form *in* and not upon the surface of the agar. The perithecia were of many and strange shapes, not at all resembling those of the leaves except in the cellular structure of the wall and the size and shape of the spores. This was an unusual instance of the direct modifying effect of the surrounding media upon the size and form of the perithecia. The species is apparently new and may be called *Pleospora Tropæoli.*

BYRON D. HALSTED: "*Secondary spores of anthracnoses.*"—A study of the germinating spores of species of anthracnose shows that the formation of "special cells" or "secondary spores" is probably confined to two genera, viz: Glœosporium and Colletotrichum. They seem to be constantly present in these two genera. Those conditions which are not especially favorable for the production of ordinary spores are well adapted to the formation of secondary ones. There is some uniformity in the color and shape of the special cells, but more in the position they occupy upon the filament. The nature of these cells is not easily determined. They seem to be bodies for enduring periods unfavorable for the growth of the fungus. These cells sometimes increase in number and form a sclerotium, as is well known among some other fungi.

BYRON D. HALSTED: "*A bacterium of Phaseolus.*"—The paper announces the discovery of a new bacterial disease of beans, the species is characterized, and the name Bacterium Phaseolum proposed.

THOMAS MEEHAN: "*The significance of cleistogamy.*"—In the author's absence the paper was read by title.

Proceedings of the Botanical Club of the A. A. A. S.

The first meeting of the Club for the year convened promptly, Thursday, Aug. 18, at 9 A. M. in a room well adapted to the purpose in the main building of Rochester University. An unusually large number of botanists were in attendance. In the absence of both the president, Prof. V. M. Spalding, and the vice-president, Dr. Stanley Coulter, Dr. H. H. Rusby was chosen to preside. The secretary, Mr. D. G. Fairchild, presented his report as treasurer, which was accepted. A contribution from those present, amounting to $4.20, was made to cover the small deficit remaining on the books and to provide for future expenses.

Messrs. Hollick, Barnes and Coville were appointed a committee on nomination of officers for the next meeting. After announcements regarding excursions, a committee on nomenclature was appointed upon motion of Dr. Britton, consisting of Messrs. N. L. Britton, J. M. Coulter, H. H. Rusby, W. A. Kellerman, F. V. Coville, L. M. Underwood and L. F. Ward.

A paper read by Mr. F. V. Coville, mentioned again in the list of papers below, led to the appointment of a committee of three, F. V. Coville, W. J. Beal and B. E. Fernow, to consider the botanical use of the terms *range*, *locality*, *station* and *habitat*. After the reading of papers by Mr. Thos. Morong and Prof. L. M. Underwood, the Club adjourned.

THURSDAY, August 18, 1 P. M.:

Papers were read by Mr. F. B. Maxwell and Mr. W. F. Swingle, both of which led to prolonged discussions, after which the Club adjourned.

FRIDAY, August 19th, 9 A. M.:

The morning session opened with a paper by Mr. Morong upon asclepiadaceous insect traps.

Upon motion of Prof. Beal a vote of thanks was tendered to Dr. E. B. Southwick, botanist of the N. Y. Central Park, for his exhibit of 60 or more species of fruits and nuts, including their branches and leaves, freshly gathered from the park.

The Club has always taken a special interest in the Botanical Division of the U. S. Department of Agriculture, and in accordance with the custom of the Club, the president called upon Dr. Geo. Vasey, the Chief of the Division, to inform

the members in regard to the work now being prosecuted. He said that on account of diminished appropriations the work of the present season is somewhat restricted. The chief field work is in Idaho, by Messrs. Sandberg, Small and MacDougal. Over 53,000 specimens have already been received. The distribution of specimens to agricultural colleges continues. The economic and scientific publications of the Division will continue as heretofore. The third part of the flora of Texas, being prepared by Pres. J. M. Coulter, will be published in a few months. The stations for testing the economic value of native grasses in the arid regions, the first one established four years ago, have been partly abandoned for want of funds. The principal station is at Garden City, Colo., and embraces 160 acres, of which 25 acres are devoted to Bromus inermis, the most successful grass so far tried in the region. Other grasses are also grown in considerable quantities.

Dr. Britton, chairman of the committee, announced that the committee on nomenclature had a unanimous report to submit, which would soon be ready in printed form. It was made the order of business for 1 P. M.

The subject of a World's Congress of botanists next year was brought up by Dr. Arthur, who gave a brief account of the movement to have a congress under the auspices, and forming a part of the general scheme, of the World's Congress Auxiliary, an adjunct organization to the World's Columbian Exposition. A request for an opinion from the committee appointed by the Auxiliary regarding the feasibility of carrying out the plans already outlined, was answered by Dr. Arthur, who said that the committee were not sanguine of success. Dr. Barnes moved "that it is the sense of the Botanical Club of the A. A. A. S. that it is inexpedient to attempt to hold an International Congress in connection with the World's Columbian Exposition in Chicago in the summer of 1893," which was unanimously adopted.[1]

The desirability of emphasizing in some way the next year's gathering of botanists was now brought forward by Dr. Arthur, and a committee of three members of the Club, Messrs.

[1] It may be noted in this connection that the Section of Biology, F, subsequently passed the following:

Resolved, That this Section appoint as its committee the outgoing officers of Section F, and the incoming officers of Sections F and G, to confer and co-operate at their discretion with World's Congress Auxiliary.

J. C. Arthur, B. L. Robinson and T. H. McBride, was appointed to report to the Club at a later session in regard to the matter.

The morning session closed with a paper by Mr. O. F. Cook.

FRIDAY, August 19, 1 P. M.:

The committee on nomenclature presented its report in printed form, which was adopted, article by article, with only a few verbal changes, as follows:

Resolved, That the Paris code of 1867 be adopted except where it conflicts with the following recommendations:

I. *The Law of Priority.*—Priority of publication is to be regarded as the fundamental principle of botanical nomenclature.

II. *Beginning of Botanical Nomenclature.*—The botanical nomenclature of both genera and species is to begin with the publication of the first edition of Linnæus' *Species Plantarum*, in 1753.

III. *Stability of Specific Names.*—In the transfer of a species to a genus other than the one under which it was first published the original specific name is to be retained, unless it is identical with the generic name or with a specific name previously used in that genus.

IV. *Homonyms.*—The publication of a generic name or a binomial invalidates the use of the same name for any subsequently published genus or species respectively.

V. *Publication of Genera.*—Publication of a genus consists only (1) in the distribution of a printed description of the genus named; (2) in the publication of the name of the genus and the citation of one or more previously published species as examples or types of the genus, with or without a diagnosis.

VI. *Publication of Species.*—Publication of a species consists only (1) in the distribution of a printed description of the species named; (2) in the publishing of a binomial, with reference to a previously published species as a type.

VII. *Similar Generic Names.*—Similar generic names are not to be rejected on account of slight differences, except in the spelling of the same word; for example *Apios* and *Apium* are to be retained, but of *Epidendrum* and *Epidendron*, *Asterocarpus* and *Astrocarpus*, the later is to be rejected.

VIII. *Citation of Authorities.*—In the case of a species which has been transferred from one genus to another the original author must always be cited in parenthesis, followed by the author of the new binomial.

N. L. BRITTON, JOHN M. COULTER, HENRY H. RUSBY, WILLIAM A. KELLERMAN, FREDERICK V. COVILLE, LUCIEN M. UNDERWOOD, LESTER F. WARD,
Committee.

The main discussion upon this report was under article VI in regard to the acceptance of named exsiccati not accompanied by a description as valid publication of a species, which was discussed by Messrs. Beal, Coulter, Vasey, Swingle, Bailey, Kellerman, Barnes, Fernow, Cook, Dudley, Morong, Britton, Underwood and Johnson. The motion to amend by including exsiccati was lost.

Dr. Britton moved that a permanent committee be appointed to serve as a board of arbitration, and to prepare and print a list of the flowering plants within the area of the sixth edition

of Gray's Manual in accordance with the recent report on nomenclature. It was subsequently agreed to extend the range to include Canada, Nebraska and Kansas. On motion of Dr. Arthur, the nomenclature committee was made the permanent committee for this purpose. A further motion was carried "that this committee be empowered to receive all suggestions and criticisms of this list, and to report upon them at the next year's meeting."

MONDAY, August 22d, 9 A. M.:

In absence of the acting president, Dr. H. L. Russell was called to the chair. The committee on nomination of officers for next year reported the names of Dr. W. P. Wilson of the University of Pennsylvania for president, Prof. W. A. Kellerman of the University of Ohio, for vice-president, and Prof. T. H. McBride, of the University of Iowa for secretary. They were elected unamiously.

Papers were then read by Mrs. E. G. Britton, Dr. B. D. Halsted, Mr. F. V. Coville, Dr. N. L. Britton, Dr. J. C. Arthur, and Dr. L. M. Underwood.

The following motion presented by Dr. Britton was approved:

"That Dr. Lucien M. Underwoood be delegated to represent this association of American botanists at the International Botanical Congress to be held at Genoa, Italy, Sept. 4–11, 1892."

A committee of three was then appointed to obtain funds by subscription to defray the expenses of the delegate. Drs. J. M. Coulter, W. P. Wilson and E. F. Smith were named such committee.

MONDAY, August 22d, 1:00 P. M.:

The club was called to order with vice-president Wilson in the chair. The committee on plans for the next year's meeting presented a report recommending:

I. (1) That the officers of the section of botany for 1893 (vice-president and secretary) shall, together with one person to be chosen by the Botanical Club, constitute a committee to whom is referred the arrangement of a special program for the meeting of 1893.

(2) That this program shall include among other matters certain special topics selected by the committee.

(3) That each topic shall be introduced by a paper presented by some person to whom the topic has, with his consent, been assigned.

(4) That upon completion of the preliminary program and other arrangements a printed statement with an invitation to be present at the meeting be sent to both American and foreign botanists.

II. That a committee of three, of which Dr. N. L. Britton shall be chairman, be appointed to make such arrangements for special excursions at the close of the meeting as may be found practicable and desirable.

The matter of a new society of botanists, to more fully unify and subserve the botanical interests of the country, was next introduced by Prof. L. H. Bailey. After some discussion, showing a general belief that such a society was desirable, but with some doubts as to the advisability of establishing it at the present time, a committee of nine was appointed "to consider the formation of an American Botanical Society, after obtaining the views of the botanists of America on the proposition, and report thereon at the meeting of the Club next year."

Papers were read by Mrs. E. G. Britton, Mr. A. A. Crozier, Dr. W. P. Wilson and Dr. N. L. Britton.

TUESDAY, AUGUST 23d, 1:30 P. M.:

Acting President Wilson announced the following committees: On program for Madison meeting, Chas. E. Bessey, Frederick V. Coville and Chas. R. Barnes; on botanical excursions at the close of the Madison meeting, N. L. Britton, Wm. Trelease and Douglass H. Campbell; on the establishment of an American Botanical Society, L. H. Bailey, W. G. Farlow, Emily L. Gregory, Byron D. Halsted, James Fletcher, Douglass H. Campbell, Charles R. Barnes, F. Lamson-Scribner and Lester F. Ward. On motion of Dr. Britton the name of W. P. Wilson was added to the last committee.

The committee on the use of certain topographical terms brought to the attention of the Club by Mr. Coville on the first day of the session, reported through its chairman, Mr. B. E. Fernow, that a unanimous decision had not yet been reached. On motion the committee was continued to report at the next year's meeting.

Papers were read by Mrs. Wolcott and Mr. Chas. Mohr. The Club adjourned to meet at Madison, Wisconsin, in 1893.

COMMENTS.

The attendance upon the meetings of the Club throughout was excellent, quite equaling that of the Section of Biology. Many more papers were listed than could be read for want of time, and others would doubtless have been presented if the authors had seen any probability of gaining a hearing. Never in the history of the Club have so many matters of general interest, which may be grouped under the caption of "business," come before the Club for decision. In fact the time

consumed in transacting business, although conserved to the utmost by the watchfulness of the chair, and the assistance of committees, seriously interfered with the reading of papers, and introduced an element of irregularity and uncertainty into the program that detracted somewhat from the general interest which usually centers upon the hearing of papers and their discussion. Hereafter matters of this class will doubtless largely come before the newly formed Section of Botany.

If the business brought before this meeting was considerable and somewhat burdensome, it is pleasant to reflect that for the most part it sustained more than usually important relations to the general welfare of American botanical science, and that the large number of able and representative men present must go far toward insuring approval of the decisions from other botanists, who had not the privilege of being in attendance. The full list of botanists present can not be given for want of space, but a few may be mentioned, viz: L. H. Bailey, Cornell Univ. N. Y.;W. J. Beal, Mich. Agr. Coll.; N. L. Britton, Columbia Coll., N. Y.; Mrs. E. G. Britton, N. Y.; O. F. Cook, N. Y.; J. M. Coulter, Ind. Univ.; J. C. Arthur, Purdue Univ., Ind.; C. R. Barnes, Univ. of Wis.; F. V. Coville, U. S. Div. of Botany; W. R. Dudley, Leland Stanford Univ., Cal.; D. G. Fairchild, U. S. Div. of Veg. Path.; B. E. Fernow, U. S. Div. of Forestry; B. D. Halsted, N. J. Exper. Station; Arthur Hollick, N. Y.; W. A. Kellerman, Univ. of Ohio; T. H. McBride, Univ. of Iowa; Charles Mohr, Ala.; Thomas Morong, Columbia Coll., N. Y.; B. L. Robinson, Harvard Univ., Mass.; H. H. Rusby, Coll of Pharmacy, N. Y.; H. L. Russell, Univ. of Chicago, Ill.; F. L. Scribner, Univ. of Tenn.; E. F. Smith, U. S. Div. of Veg. Path.; G. B. Sudworth, U. S. Div. of Forestry; W. T. Swingle, U. S. Div. of Veg. Path.; M. B. Thomas, Wabash Coll., Ind.; Wm. Trelease, Mo. Bot. Garden; L. M. Underwood, De Pauw Univ., Ind.; Geo. Vasey, U. S. Div. of Botany; M. B. Waite, U. S. Div. of Veg. Path.; L. F. Ward, Smithsonian Inst., D. C.; and W. P. Wilson, Univ. of Penn.

Papers presented to the Botanical Club of the A. A. A. S.

For the first time in the history of the Club the daily program was printed as part of the daily program of the A. A. A. S., which proved a great convenience. The advantage of knowing what papers were upon the list, however, was largely neutralized by the miscellaneous introduction of business, which took much of the time, and made it impossible for either readers or auditors to judge when a paper would be called. The volume of the business transacted accounts for the comparatively small number of papers read, and the many left unread.

The following papers were read:

AUGUST 18TH, MORNING SESSION.

F. V. COVILLE: *Use of the terms range, locality, station and habitat.*—The confusion in the botanical use of these words was pointed out. A definition of each was submitted and their usage in accordance with the same illustrated. The discussion was participated in by Dr. C. R. Barnes, Dr. N. L. Britton, Mr. W. H. Seaman, Mr. B. E. Fernow, and Dr. Thomas Morong, and in the main supported the views put forth by the author.

THOMAS MORONG: *Travels in Paraguay, and its flora.*—The author prefaced his paper by saying that when in Paraguay he had received the expression of good will and sympathy sent by the Club in session at Toronto in 1889, and he now desired at the first opportunity he had had, to specially thank the Club for its courtesy, and to further show his appreciation he had prepared the present paper, briefly giving an outline of his travels. The author then read a very interesting account of the territory traversed, the perils and interruptions encountered, and especially of the nature of the vegetation. Drs. Rusby and Britton added some information, particularly in regard to the dangers of the trip and its happy termination.

L. M. UNDERWOOD: *A variety of Polypodium vulgare, new to America.*—This much altered form was found on Mohawk Mt., Conn., and was believed to be worthy the rank of a variety. Specimens were shown. The author took the opportunity to exhibit specimens of Onoclea sensibilis, in which the sterile fronds had been destroyed, and the later-appearing fertile fronds had unrolled, taking on a shape intermediate between the usual sterile and fertile fronds, and becoming as-

similatively active. This form, the so-called var. obtusilobata, he believed always to arise from injury to the vegetative fronds of the plant, and to be in no wise due to hybridity.

AUGUST 18TH, AFTERNOON SESSION.

F. B. MAXWELL: *Symbiotic growths in the roots of Ranunculaceæ.*

W. T. SWINGLE: *Some rare and interesting fungi from Florida.*—Specimens were shown and a description of the development, so far as known, was given of new parasites of more than usual interest. An ascomycetous species, in some respects resembling Claviceps, attacked and totally destroyed the inflorescence of Cenchrus tribuloides.

AUGUST 19TH, MORNING SESSION.

THOMAS MORONG: *Observations upon certain species of Asclepiadaceæ as insect traps.*—The conclusion was reached that the parts holding the insect were sensitive, and were brought firmly together by the irritation due to the presence of the insect's proboscis. The author also took the opportunity to exhibit fresh specimens of his Nuphar rubrodiscum, which, upon further study, he still believed to be a good species. If it were to be degraded to a variety, he thought it should go under N. Kalmianum, and not under N. advena, as in the last edition of Gray's Manual.

O. F. COOK: *General notes upon the flora of Liberia.*—The general topography, climate and appearance of the vegetation were described. It is moist and warm the year round, there being no true dry season. Coniferæ are entirely absent. Aquatic plants and mosses are scarce, but hepatics are wonderfully abundant, both in species and individuals. A tree-like lycopod, 8 to 10 feet high, is a common and beautiful object. Agaricini and Polyporei are very common, and of most bewildering complexity of forms. Gasteromycetes are rare, and parasitic fungi of all kinds almost wholly absent. Even the cultivated plants are without rusts, smuts, mildews or leaf-spots.

AUGUST 19TH, AFTERNOON SESSION.

No papers were read.

AUGUST 22D, MORNING SESSION.

MRS. E. G. BRITTON: *On the proposed handbook of mosses of Eastern America.*—Drawings prepared to illustrate this work were exhibited and the general plan of the work described.

B. D. HALSTED: *Weeds and weed roots.*—Photographs of the plants described in his "Century of American Weeds," and also of the root systems of classified groups of these weeds were shown.

F. V. COVILLE: *The re-discovery of Juncus Cooperi.*

N. L. BRITTON: *The North American Amelanchiers.*—There appear two well marked species along the eastern coast: A. Canadensis, an upland form with birch-like leaves, and A. spicata, a swamp form of smaller growth and more spicate inflorescence. These do not appear to intergrade, but their western range and variations are not yet well known. Beside these two, the other species of the genus were briefly described and illustrated with herbarium specimens. The genus is believed to contain seven American species. Material for study, especially from the interior, is solicited.

J. C. ARTHUR: *A new form of root cage.*—This consists essentially of two glass plates held about an eighth of an inch apart by removable metal clips, between which the soil is placed and the plants grown. The glass plates are so close together that nearly or quite all the roots may be seen from one side or the other during the whole period of growth. The glass cage is set in a convenient zinc trough for holding water, and the roots protected from light by zinc sides. It is designed for the study of geotropism, the relation of roots to soils, etc.

N. L. BRITTON: *The botanical garden movement in New York.*—The present very favorable condition of the project for a New York garden was outlined, and the opinion given that it would be established in a year or two, and under favorable regulations for its scientific control. Dr. E. F. Smith expressed the gratification felt by all botanists that a garden of such size and prospective value was soon to be added to the few at present in America.

L. M. UNDERWOOD: *A few additions to the hepatic flora of the Manual region.*

AUGUST 22D, AFTERNOON SESSION.

MRS. E. G. BRITTON: *On the genus Campylopus in North America.*—After a general account of the genus, the author spoke of a new species, *C. Millspaughi*, which has been separated from *C. flexuosus*, with abundant material for distribution. Two other new species were mentioned, and drawings and specimens exhibited.

A. A. CROZIER: *Note on a recent outbreak of peach yellows near Ann Arbor, Michigan.*—Described isolated outbreaks of the disease, and its gradual spread from centers of infection, in such manner that the theory of its contagious nature was well borne out.

W. P. WILSON: *Some observations on Epigæa repens.*—This species, as well known, is polymorphic. It appears to have once been trimorphic, but now possesses all intermediate forms. The female flowers have no pollen, and usually no anthers, and sometimes even no trace of stamens. The male flowers are without stigmas. The staminate and pistillate plants are so distinct in appearance as to be told at a distance. The female form is the more vigorous and predominant, but seed production is rare. Prof. Halsted called attention to the fact that there was only one size of pollen.

N. L. BRITTON: *Notes on some species of Cratægus.*—The forms of this genus are many of them difficult to distinguish, and more material and study is needed. *C. flabellata* Bosc., an extremely rare form from Canada, and *C. glandulosa*, from Delaware, with large and abundant glands upon the inflorescence, need especial attention.

AUGUST 23D, AFTERNOON SESSION.

MRS. H. L. WOLCOTT: *Observations on the ripening of the seeds of Cuphea.*—Attention was called to a cultivated variety with large flowers, which pushed the placenta laterally through the walls of the ruptured ovary and calyx tube, bringing the immature seeds into the air to ripen. Dr. Britton mentioned that the adaptation also occurred in Cuphea viscosissima.

CHAS. MOHR: *Notes on the mountain flora of northern Alabama.*—This paper will soon appear in *Garden and Forest.*

The following papers still remained upon the program unread at the final adjournment:

A. S. HITCHCOCK: *Notes on some Kansas weeds.*

W. W. BAILEY: *Notes on the flora of Block Island.*

L. H. PAMMEL: *Notes on the distribution of a few plants.*

L. H. PAMMEL: *Phaenological notes for 1892.*

THEO. HOLM: *Notes on terminology.*

MRS. E. G. BRITTON: *On the genus Ditrichum in North America with one Western species and corrections for two Eastern species.*

THOMAS MORONG: *Notes upon a revision of the North American Naidaceæ.*

M. B. WAITE: *Notes on some pear and apple diseases.*

E. S. GOFF: *Modifications of the tomato plant resulting from seed selection.*

MRS. E. G. BRITTON: *Some of the rare mosses of White Top and vicinity recently collected on a trip to southwestern Virginia.*

J. C. ARTHUR: *Galvanotropism.*

A. A. CROZIER: *A botanical terminology.*

MRS. E. G. BRITTON: *A proposed collection of mosses of New York state for the Columbian Exposition.*

W. P. WILSON: *Climbing habit of Tillandsia usneoides.*

O. F. COOK: *Some general questions in the classification of Myxomycetes.*

J. M. COULTER: *North American Cacti.*

L. H. BAILEY: *Cultivated species of Brassica.*

P. H. ROLFE: *Notes on the distribution of plants in Florida.*

L. H. PAMMEL: *Notes on some fungi common during the season of 1892 at Ames, Iowa.*

BRIEFER ARTICLES.

Polygonum persicarioides HBK. — According to Hemsley (Biol. Cent. Am. III, 34) the range of this plant is from Mexico to Chili and Peru. It is represented in the National Herbarium by the Wilkes' Expedition plant from Lima, Peru; by an unnamed plant collected by Botteri near Orizaba, Mexico, and numbered 1163; and by three plants that had been referred to *Polygonum persicaria* L., viz., Palmer's no. 137, collected in 1885 in S. W. Chihuahua, Mex.: Palmer's no. 211, collected in 1887 near Angeles Bay, Lower California; and the Mexican Boundary Survey plant no. 1183, collected in the valley of the Rio Grande, below Donna Ana, N. Mex. Recently Mr. H. Wurzlow sent this species from Industry, Austin Co., Texas, which extends its range into the United States.

All these plants mentioned agree essentially with the description in HBK., Gen. Pl. II, 179, with some exceptions. First, the leaves are not glabrous below, but *above;* while *below* they are "beset with numerous minute hairs." I may add: midrib below and margin beset

with coarser appressed hairs in all our specimens. It must be that the first description is wrong on this point. Then, the leaves are in no case "7—8 lines wide," but ⅜ in. to ½ in.; the Angeles Bay plant having some leaves as wide as ⅝ in. Furthermore, the description has "Calyx 4-parted . . . Stamens 6 according to Bonpland. . . . Achene lenticular." I have frequently found the calyx 5-parted, stamens as many as 8, and the achenes in the Angeles Bay and the Orizaba plant—the latter from one of the stations cited in Biol. Centr. Am. l. c.—as well as in the Texas plant, are triangular: all, however, of the same size, and all "umbonate," as in the first description.

This species is distinguished from *P. persicaria* L. by its narrower, longer leaves, more slender spikes and smaller achenes.—J. M. Holzinger, *Department of Agriculture, Washington, D. C.*

New Mosses of North America.—The following brief diagnoses are published in advance of fuller descriptions in order to secure priority. We hope to prepare shortly the fifth number of our series under the above title, in The Botanical Gazette.

Dichodontium olympicum n. sp.—A D. *pellucida* jam multo robustiore primo visu differt: foliis valde papillosis, toto fere ambitu minute denticulatis, capsulaque basi strumosa. Planta humilis, vix 1 cent. alta.—Olympic Mts., Wash. (*L. F. Henderson.*)

Grimmia Hendersoni n. sp.—*G. decipienti* Lindb. (G. *Schultzii* Wils.) proxima sed ab ea pedicello longiore, capsula subcylindrica magis elongata, operculo longius rostrato et foliorum rete basilari multo laxiore facillima distinguenda.—Hood River, Oregon, on dry rocks. (*L. F. Henderson*).

Encalypta lacera n. sp.—Ab *Enc. vulgari* proxima differt calyptra basi lacerata, peristomio e membrana alba fugacissima lacerata composito et pedicello longiore.—Milwaukie, Oregon, Willamette River, (*L. F. Henderson*).

Leskea obtusa n. sp.—Formis robustioribus *L. polycarpæ* similis. sed ab illis primo aspectu foliis obtusis marginibus planis distincta, A *L. obscura* habitu valde robustiore, foliis majoribus et magis obtusis, costa breviore et capsula majore et longiore quoque differt.—Bethlehem, Pa., mixed with *Anomodon obtusifolius* (*Rau.*) Chinchuba, La., near Mandeville, on trees (*Langlois*).—F. Renauld and J. Cardot, *Monaco, and Stenay, France.*

EDITORIAL.

THE RECENT upheavals in nomenclature, culminating in the work of Otto Kuntze, are too well known to need recapitulation. It had become evident to most botanists that some agreement must be reached or confusion would become worse confounded. This feeling found public expression in Europe in the circular recently issued from Berlin,[1] containing certain propositions which were submitted to working botanists for their signature. It is presumed that the results thus obtained were to be presented to the International Congress at Genoa. In this country a circular with the same purpose was sent out from New York and Washington, and was the means of discovering among botanists a wide-spread desire for an agreement upon matters of nomenclature. It was felt that work in systematic botany was losing force amidst the uncertainties of nomenclature, and that almost any laws were preferable to the existing chaos.

THE TIME therefore seemed ripe at the Rochester meeting of the Botanical Club for an attempt to reach some mutual understanding. As is shown in the account of the meeting, the attendance of botanists who have to deal with nomenclature was unusually large, and it was felt to be representative, especially when taken in connection with letters containing expressions of opinion from many who were absent. The subject was not sprung in a formal meeting, but about twenty-five botanists, representing every shade of opinion, met informally and thoroughly and frankly discussed every point. Every one was ready to make concessions for the sake of agreement, and the principles finally adopted represent a resultant of various concessions. It was felt that this amicable feeling must be strengthened by an immediate agreement of some kind, and that various details could be arranged afterwards. The principles proposed were adopted by the Botanical Club with remarkable unanimity, the only real question raised being as to the advisability of so rigidly restricting the publication of species, some thinking that distributed specimens bearing a name should be included.

IN THE OPINION of the GAZETTE the paper adopted represents a thoroughly wise compromise, alike honorable to all concerned in its preparation, as witnessing a far greater desire to steady nomenclature than to hold fast to individual opinion. This is the spirit in which it should be received by all American botanists, and small differences of opinion should be lost sight of for the general good.

THIS ACTION of American botanists will be presented at Genoa, as

[1] See this journal for August, p. 267.

representing their proposition in the direction of an international agreement. As it is not widely different from the Berlin propositions some agreement may be reached, but we should not be too sanguine concerning this. If the Genoa Congress adopts a set of principles so little at variance with our own that complete agreement is possible, the standing committee is authorized to submit the matter to a vote (by mail) of the American botanists.

IT WAS a wise thing to appoint a standing committee to prepare a tentative list of the flowering plants of the so-called "Manual range" under the rules adopted and present it at the next meeting of the Club or of the new Botanical Section of the American Association. This will give the most conspicuous example of the working of these rules that could be selected from our flora, and botanists can have before them a concrete illustration, and can then determine whether the principles adopted work reasonably well or not. In the opinion of the GAZETTE the changes that will follow in Manual names will be much fewer than many suppose.

IN THIS CONNECTION it may be well to call attention to a single provision of the adopted rules; which is, to make 1753 (Linn. *Sp. Plant., ed. 1*) as the common point of departure for both genera and species. This will do away with a number of generic names that have been recently revived, and is better in this regard than the Berlin proposition, which takes the fourth edition of Linnæus' *Genera Plantarum* (1752) as the point of departure for genera. If the 1753 date is adopted at Genoa, the list of genera which are proposed by the Berlin circular as exceptions will be shortened, and in fact so few that concern American botanists will be left that they should not be considered when involving a dangerous precedent.

THE ROCHESTER MEETING bids fair to mark an epoch for American botanists. Not only was an agreement concerning nomenclature reached, but botany was dignified by being made a distinct section of the American Association. It will be long before section G sounds as home-like as section F, but as the botanists were suing for the divorce it was graceful to leave the house in the possession of zoology. However, the divorce is not complete, for provision was made by which joint sessions are to be held for hearing papers of general biological interest. The GAZETTE has so frequently given the reasons that have been urged for this separation that they must be familiar. The same reasons were overwhelmingly evident at Rochester, where the flood of botanical papers was beyond all precedent. The botanists are now responsible for a section, and they can begin the preparation of papers for the next meeting in the full assurance of having not only time for a hearing, but also for discussion.

THE ACTION of the Botanical Club, of course fully representing the new section G, in reference to the International Botanical Congress in connection with the Columbian Exposition, was thoroughly prudent. By correspondence and by personal investigation it had become sufficiently evident that a very meager representation of European botanists could be expected, and that nothing was to be gained by coöperation with the World's Congress Auxiliary. It seemed somewhat absurd to call a meeting of American botanists an "International Congress." However, the attractions of the year are to be taken advantage of, and foreign botanists urged to attend themeeting of the Botanical Club, which has a committee appointed to do all it can towards making their stay pleasant and profitable.

CURRENT LITERATURE.

The lower cryptogams.[1]

Professor Ludwig of Greiz is known as one of the most energetic German students of the mutual relations between plants and animals, and of the fungi, especially those connected with some of the obscure gum diseases of trees. For a series of years he has reviewed mycological literature for Just's Jahresbericht, which has caused him to become quite familiar with the work being done by specialists in that field, so that his text-book is unusually rich in references to recent work. The book is essentially a review of the thallophytes, with especial reference to economic questions, nearly 600 pages being devoted to the fungi, and only about one-tenth as much to the algæ, inclusive of lichens. A full index makes reference to the cryptogams themselves, as well as host plants, etc., quite easy, although the hosts are indexed only under their common names. The book appears to be carefully and well written.—W. T.

Minor notices.

PROFESSOR GREENE'S *Pittonia* (vol. II, pt. 11; May–Aug., 1892) contains a very interesting paper upon Dr. Kuntze and his reviewers, chiefly the latter. The reviewers referred to are Hemsley (*Nature*), Jackson (*Jour. Bot.*), Britton (*Bull. Torr. Bot. Club*), and Schumann

[1] LUDWIG, FRIEDRICH.—Lehrbuch der niederen Kryptogamen, mit besonderer Berücksichtigung derjenigen Arten, die für den Menschen von Bedeutung sind, oder in Aeushalte der Natur eine hervorragende Rolle spielen.—8vo, pp. xvi+672. Stuttgart, Enke, 1892.

(*Nat. Rund.*). The reviewer of reviews, while acknowledging in a general way that he may have been even more radical than Kuntze, cannot subscribe to all his views, although this probably refers to certain minor points. He points out very clearly that this much criticised author has the merit of consistency in his application of the "Paris Code," a fact which would seem to indicate that the time has come to guard the workings of the code. Professor Greene regards Kuntze's work as the most important contribution to the literature of nomenclature that has ever been made and one for which all botanists should be grateful, an opinion which THE GAZETTE has already expressed.

IN THE SAME publication Bentham's genus *Linanthus* is restored to include some twenty-five species which have been usually placed under *Gilia*. Many new species from the wonderful Pacific coast flora are also described.

PROFESSOR A. C. APGAR is the author of a small book dealing with the trees of the Northern United States[2]. There can be no doubt that the trees are too much neglected by pupils in botany, and that many a person becomes familiar with the herbaceous flora of his neighborhood without being able to recognize the trees. This book is prepared for the easy determination of our trees, cultivated as well as indigenous. As it does not profess to be written for the professional botanist it should be judged merely from its adaptation to its audience. An easy analytical key to genera is provided, and illustrations are plentifully sprinkled through the text. There is no reason why this book should not be very useful in enabling students to become acquainted with trees, a thing much to be desired.

DR. W. J. BEAL AND MR. C. F. WHEELER have published a catalogue of Michigan plants[3], which is based upon the Wheeler & Smith catalogue of 1880. The pamphlet contains some 70 pages of valuable prefatory material, discussing from numerous points of view the flora of the state, and including many group lists. The catalogue contains 1746 numbers, including the pteridophytes. The publication is a valuable addition to our increasing list of useful local catalogues.

[2] APGAR, AUSTIN C.—Trees of the Northern United States, their study, description and determination, for the use of schools and private students. 8vo. pp. 224. American Book Company: New York, Cincinnati, Chicago.

[3] BEAL, W. J. and WHEELER, C. F.—Michigan Flora. Prepared for the 30th Ann. Rep. of the Sec'y of the State Board of Agric. 8vo. pp. 180. Lansing, 1892.

OPEN LETTERS.

Dr. J. P. Campbell's "Biological Instruction."

I was interested to read in the last number of THE GAZETTE an appreciative review of the recent work of Dr. J. P. Campbell of the University of Georgia concerning the methods of biological instruction in American colleges and universities. On account of the inadequate treatment given the subject of botany in the chapter of Dr. Campbell's work which refers to the University of Minnesota, I wrote asking him to explain why he had neglected a department which might have claimed some attention in such a book as he was putting forth. I received from him a reply that is so complete an exposition of his intellectual position and capacity for undertaking the broad treatment of biological instruction in the United States that I cannot refrain from giving a few sentences wider circulation. Since the letter was in no way confidential I feel at liberty to do this. Dr. Campbell begins by exhibiting great surprise and indignation that I should have dared to call him to account for his inaccuracies. He says: "I am not accustomed to being called to account and asked if I 'have any explanation to offer' nor do I recognize the right of any one to do so, and this letter is only written on the assumption that you expressed yourself more strongly than you thought." In reply I called Dr. Campbell's attention to the fact that in the taking up of such a work as he had attempted he had exposed himself to criticism, and that he would find as his experience in publishing grew wider he might often merit and receive criticism and correction. He assures me in his letter that a circular was sent from Washington to the professor of biology at each institution and from the replies to these circulars his work was compiled. I am informed by Professor C. W. Hall (at that time professor of biology at the University of Minnesota) that he received no such circular; but one was received by the professor of *animal* biology, Dr. H. F. Nachtrieb. This indicates the care with which Dr. Campbell's circulars were sent out. Further, in the list of teachers there was no mention of Professor Hall's name while there was of Professor Nachtrieb's, showing how carefully this table was arranged.

Observing the extraordinary and altogether unnecessary impression that Johns Hopkins University seemed to have made upon Dr. Campbell I took occasion in my letter to him to express my high appreciation of the zoölogical work done at that institution and my very low appreciation of the biological work done by any institution where they are willing to omit one-half of the science. Indeed I indicated a certain feeling of contempt for the burglarious use of the word "biology" which is permitted at this institution which has had such an extraordinary influence upon American biological instruction. To this Dr. Campbell replies with characteristic vigor and enthusiasm. He says: "I cannot help thinking if you had stayed longer at Johns Hopkins and caught more of the spirit of the place you would have found that the instruction in biology is not by any means 'weak' as you are pleased to term it, but that it has taken its present form, so far at least as the strictly undergraduate work goes, simply because they are unhampered by traditions and are free to carry out their ideas of the

relative importance of subjects, and these I admit are a little in advance of the times. In the five years that I worked there I frequently heard the value of botany insisted upon for training children and I also heard Dr. Martin emphasize the necessity of studying animal and vegetable forms together as in the general biology course."

We have here the pleasing suggestion that botanical work is of value for training children! It would be difficult to ask for a more perfect exhibition of the spirit with which Dr. Campbell came to his task of writing a broad account of biological instruction in Amer ca. I should be far from holding Johns Hopkins responsible for any indiscretion of Dr. Campbell, but under the circumstances it seems a matter of distinct regret that any institution in America should permit a man to graduate from a five years course in biology with the notion that the science of our food-supply, to put it upon a purely economic basis to say nothing of any other, is a fit thing to amuse children with. It is, too, an interesting thing to note in these days of specialization, that it is the zoölogist who wishes to talk of "biology" (which is after all only a synonym of the old phrase, "natural history"); while the botanists, recognising the twin sciences, are willing to give each a place and name. It is possible that the botanists are somewhat in advance of the times, as Dr. Campbell would say.

I have written thus at length because I feel that I am in a position to show the botanists of the country somewhat of the animus that has been displayed in the compilation under government control of what should have been a valuable, accurate, broad-minded, adequate and complete account of the biological work in American colleges. It is unfortunate that it was intrusted to a gentleman who after five years of what he supposes is biological instruction—and I have no reason to think that Dr. Campbell is insincere in supposing that he is a biologist—has the pleasant way of characterising botany as valuable for the training of children.—CONWAY MACMILLAN, *University of Minnesota, Minneapolis.*

NOTES AND NEWS.

MR. W. W. CALKINS has some interesting words regarding the study of lichens in America, in *Science* for August 26.

PROFESSOR GEO. F. ATKINSON has been appointed Assistant Professor of Cryptogamic Botany at Cornell University.

MR. HENRY E. SEATON, Instructor in Botany in Indiana University, has been appointed Assistant Curator at the Harvard Herbarium.

DR. GEORGE VASEY is the accredited representative of the Department of Agriculture and Smithsonian Institution to the International Congress of Botanists at Genoa.

A PRESENTATION of the question of priority in botanical nomenclature from the ethical point of view is given by Prof. L. M. Underwood in *Science* for Aug. 26 (xx, 16).

THE OFFICERS of the new section of botany, G, of the A. A. A. S. for the ensuing year are Dr. Charles E. Bessey of the University of Nebraska, vice-president, and Mr. F. V. Coville, of the U. S. Division of Botany, secretary.

DR. J. C. ARTHUR returned from his European trip early in August, and reports that some botanists, including a few of the most renowned, will probably visit this country next year, but the number is not likely to be large.

PROFESSOR WM. R. DUDLEY, of Cornell University, has been appointed Professor of Systematic Botany at Stanford University. Professor Dudley's work will largely be in the direction of studies in geographical distribution, for which the University is so favorably situated.

FOR THE FIRST TIME in the history of the Botanical Club there was no excursion or reception designed especially for botanists during the recent meeting. The local committee tendered an afternoon excursion to the Club, however, which could not be accepted for lack of time. Upon Saturday each botanist chose the excursion he preferred, there being no pre-arrangement.

DR. B. L. ROBINSON has been appointed Curator of the Harvard Herbarium, and arrangements have been made by which he can have time at his disposal for the completion of the Synoptical Flora. It is the present intention to push this great work as rapidly as possible, an intention which will be warmly commended by American botanists, who were fearful that it might be abandoned altogether.

THE BOTANICAL INSTITUTE at Munich, Germany, is prospering greatly under the management of Prof. Dr. Goebel, who took charge less than a year ago. The building has been renovated, and a considerable addition is now in course of construction, which will contain laboratories for physiological work. The supply of alcoholic and dried material for illustrative purpose has also been much increased, and a series of charts of large size has been specially prepared.

THE CONSPICUOUS ITEMS in the proceedings of the Rochester meeting of the Botanical Club are: (1) the nomenclature agreement; (2) the appointment of Professor Underwood as the Club's representative at Genoa; (3) the action with reference to an International Congress of botanists in connection with the Columbian Exposition; (4) the appointment of a committee to define the terms "range," "locality," "station," and "habitat"; (5) the appointment of a standing committee to prepare a list of plants of the "Manual range" under the adopted rules.

NO SMALL PART of the credit for the large attendance of botanists at the recent gathering in Rochester, and for the unusually full list of papers presented before the Botanical Club, is due to Mr. D. G. Fairchild, the secretary of the Club. By correspondence and solicitation before the meeting he was enabled to present upon the first day of the session a long list of names of those who had signified their intention of being present, and of papers which were to be read. It is

work of this kind which creates and sustains unusual interest in scientific gatherings, and it is a pleasure to note the disinterested and efficient manner in which the present secretary of the Club has performed such self-imposed duties.

THE FOLLOWING PAPERS were read before the Botanical Sub-Section of the British Association for the Advancement of Science, on Friday, August 5th, at the meeting in Edinburgh: "A proposed World's Congress of Botanists at Chicago in 1893," by Dr. J. C. Arthur of La Fayette, Ind., U. S. A.; "Observations on secondary tissues in monocotyledons," by Dr. Scott and Mr. Brebner; "On the simplest form of mosses," by Prof. K. Goebel of Munich, Germany; "On the cause of physiological action at a distance," by Prof. Léo Errera of Brussels, Belgium; "Notes on the morphology of the spore-bearing members in the vascular cryptogams," by Professor Bower; "Notes on an aposporous fern-seedling," by C. T. Druery; "A Chytridian parasitic on Cyclops' eggs," by Prof. M. Hartog; "Arrangement of the buds in Lemna minor," by Miss Nina Layard. Other botanical papers were read on the following Tuesday.

A RECENT ANNOUNCEMENT of the University of Minnesota states that the laboratories of botany occupy a suite of rooms in Pillsbury Hall, viz: (1) herbarium and seminar rooms, (2) a student's morphological and chemical laboratory, (3) an experimental physiology laboratory, (4) a special laboratory, office and reading room, (5) a dark room, (6) a special work room. These with other rooms give a floor space of 6,000 square feet. The laboratory contains microscopes, auxanometers, clinostats after Pfeffer's patterns, thermo-electric apparatus, a Mackintosh lantern, microtomes after Minot and Jung-Thoma, centrifugal wheels, induction coils, heliostat, Lautenschlager's bacterioscopic and sterilizing apparatus, water-motor, balances, thermometers, etc., giving full facilities for elementary, advanced and original work in the field of botany, considered in its widest sense. The herbarium contains over 60,000 specimens. A botanical museum and economic collection has been begun.

IN VIEW of the fact that the nomenclature agreement was the result of a movement inaugurated by the Berlin circular, published in the last number of the GAZETTE, and of the New York and Washington circular, the principles proposed by the latter are here put on record:

I. The adoption of initial dates for generic and specific names.

II. That the publication of a generic name or a binomial specific name invalidates the use of the same name for any subsequently published genus or species.

III. That in the transfer of a species to a genus other than the one under which it was first published, the original specific name is to be preserved, unless such name has previously been employed in the genus to which the species is transferred; and if the author who transfers such species alters the name, it may be restored by any subsequent author.

IV. That a varietal name be treated as equal in rank to a specific name, in its relations as a homonym and in the transfer of species and varieties from one genus to another.

THE NUMBER of botanical articles in *Science* has greatly increased during the present year. Rarely an issue now appears without considerable space devoted to some phase of botany.

A NEW CATADOGUE of microscopes and accessories has been published by the Bausch and Lomb Optical Co. recently, which contains a number of interesting novelties. The cheapness and fine workmanship of their instruments are equally to be commended. Beside new microscope accessories, some excellent bacteriological apparatus is listed, and also a remarkably long series of microscopic preparations.

THE SEPTEMBER NUMBER of *Scribner's Magazine* contains the unusual number of seven elaborately illustrated articles. One of the most interesting is that in reference to the Tilden library. It is well known that the late Samuel J. Tilden bequeathed his great fortune to trustees, with the intention of founding in New York a great library—confiding all details to the discretion of the three trustees whom he selected, Messrs. John Bigelow, Andrew H. Green, and George W. Smith. The Court of Appeals held that the discretion was too general and the will void. During the long process of the lawsuit over the will, the lips of the trustees were naturally sealed as to what were the details of the project; but now that the decision has deen reached they are freed from any such restriction—more especially as, by a fortunate arrangemeut with one of the successful heirs, they are still left in possession of a sum large in itself and sufficient to carry out an important portion of the design. Ex-Minister John Bigelow, one of the trustees, has therefore now decided to publish in ths number of the *Magazine*, under the title "The Tilden Trust Library; What Shall It Be?" the facts concerning Mr. Tilden's wishes as to the details of the plan, and also a most important proposal for still carrying out a large part of it by the erection of a great library building in the very center of New York.

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